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10/674,926	09/30/2003	Claus Michael Olsen	YOR920030005	5166

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MICHAEL J. BUCHENHORNER
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EXAMINER
BRADLEY, MATTHEW A

ART UNIT	PAPER NUMBER
2187	

NOTIFICATION DATE	DELIVERY MODE
10/11/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _12 July 2007_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-15 and 17-20_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-15 and 17-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All   b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action has been issued in response to amendment filed 12 July 2007.

Applicant's arguments have been carefully and fully considered and are persuasive.

Therefore, the rejection has been withdrawn. However, upon further consideration, a

new ground(s) of rejection is made. Accordingly, this action has **NOT** been made final.

Claim Status

Claims 1-15 and 17-20 remain pending and are ready for examination.

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires

the original numbering of the claims to be preserved throughout the prosecution. When

claims are canceled, the remaining claims must not be renumbered. When new claims

are presented, they must be numbered consecutively beginning with the number next

following the highest numbered claims previously presented (whether entered or not).

Misnumbered duplicate claim 15 that is presently cancelled has been

renumbered 16. Accordingly, misnumbered claims 16-19 have been renumbered as

17-20 and referred to as such. Appropriate compliance is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims **1-6**, **9-11**, **13**, and **18-19** are rejected under 35 U.S.C. 102(e) as being anticipated by Rudelic et al (U.S. 2004/0255283), hereinafter referred to as Rudelic.

As per independent claim **1**, Rudelic teach,

- o first and second of levels of a non-volatile storage hierarchy, (Paragraph 0046: taught as the first and second flash memories).

- o wherein accessing information in the first level consumes more energy than accessing information in the second level; and (Paragraph 0046: taught as the high performance first flash memory and rate of power consumption thereto).

- o a processor for storing only strategically selected storage data in to the second level of non-volatile storage based on energy-conserving criteria (Processor as shown in Figure 1 item 20 and as taught in Paragraph 0017 and further as the storing of minimally used portions in paragraph 0046).

As per dependent claim **2**, Rudelic teach, wherein the energy-conserving criteria comprise criteria complied using a heuristic approach (Paragraphs 0048-0049 taught as the tracking and gathering of performance metrics).

As per dependent claim **3**, Rudelic, wherein the energy-conserving criteria comprise system state information (Paragraph 0049: taught as performance metrics).

As per dependent claim **4**, Rudelic teach, further comprising a storage input/output subsystem and wherein the system state information comprises whether

the storage input/output subsystem is using one or more specific files (Paragraph 0046: taught as the determination of minimally used portions and thus files of the operating system).

As per dependent claim **5**, Rudelic teach, wherein the system state information is selected from the group consisting of: the storage input/output associated with one or more predetermined software applications; a sequence of storage input/output operations; observed interactions with the first level of the storage hierarchy and wherein the collection of heuristics infer the state of the second level of the storage hierarchy; and a type of energy source powering the system (Paragraph 0048: taught as the migration of code due to usage corresponding to the limitation of a sequence of storage input/output operations).

As per dependent claim **6**, Rudelic teach, wherein the energy-conserving criteria comprise limiting use of parts of a file system (Paragraph 0046: taught as the migration of portions of the operating system off the first flash memory and thus limiting the use of the first flash memory).

As per dependent claim **9**, Rudelic teach, wherein the system state information comprises at least one factor from among the following factors: the storage input/output data associated with the characteristics of the connection between the first and second levels of the storage hierarchy; the storage input/output data associated with characteristics of the connection between the system and at least one second level of the storage hierarchy; the proximity of the storage input/output to events that change the state of the at least one first level of the storage hierarchy; the proximity of the

storage input/output to a previous interaction with at least one first level of storage
hierarchy; an indication of a hard-disk drive spin-down event; and physical
characteristics of the second levels of the storage hierarchy (Paragraph 0049: taught as
the performance metrics).

As per dependent claim **10**, Rudelic teach, wherein the system state information
comprises physical characteristics of the second level of the storage hierarchy
(Paragraph 0049: taught as the performance metrics).

As per dependent claim **11**, Rudelic teach, wherein the second level of the
storage hierarchy are implemented using Flash memory (Paragraph 0046).

As per dependent claim **13**, Rudelic teach, wherein the processor is for removing
information from the second level of storage based on energy-conserving criteria
(Paragraph 0048: taught as a code object promotion).

As per independent claim **18**, Rudelic teach,

o two levels of non-volatile storage wherein a first level is managed and a
second level is unmanaged wherein storing information in managed
storage consumes less system resources than storing information in
unmanaged storage, the method comprising: (Paragraph 0046: taught as
the first and second flash memories)

o monitoring the system to determine whether the operating state of the
system satisfies one or more energy-conserving criteria; and storing only
strategically selected storage data in managed storage when the

operating state of the system satisfies one or more energy-conserving

criteria (Paragraphs 0046-0049).

As per independent claim **19**, Rudelic teach, a computer readable medium

comprising program instructions for: (Claim 12) monitoring a system to determine

whether the operating state of the system satisfies one or more energy-conserving

criteria; and storing only strategically selected storage data in managed non-volatile

storage when the operating state of the system satisfies one or more energy-conserving

criteria (Paragraphs 0046-0049).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **7-8** are rejected under 35 U.S.C. 103(a) as being obvious over Rudelic in

view of Thelander et al. (U.S. 2003/0009705) hereinafter referred to as Thelander.

As per dependent claim **7**, Rudelic teach the limitations of dependent claim 3 and

independent claim 1 for which dependent claim 7 depends upon.

Rudelic is silent however on, the system stores current user profiles and the

system state information comprises whether storage input/output data are associated

with a current user profile.

Thelander, the system stores current user profiles and the system state information comprises whether storage input/output data are associated with a current user profile (Paragraph 45 and Paragraph 48 and Paragraph 53).

Rudelic and Thelander are analogous art because they are from the same field of endeavor, namely power management in computing systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, having both the teachings of Rudelic and Thelander before him/her, to implement the power management profiles of Thelander into the system of Rudelic to exploit the benefit of multiple power profiles based on a user's preferences.

The motivation for doing so would have been that, the power management profile may include multiple power settings or power schemes with the same schedule, so that the user may select between different power settings or schemes to be implemented (Paragraph 45 and Paragraph 48 and Paragraph 53).

Further, it would have been obvious to implement different user profiles based on user preferences. Doing so would yield predictable results in offering the combination system the benefit of serving multiple users with different needs.

Therefore it would have been obvious to combine Rudelic with Thelander to exploit the benefit of multiple power profiles based on a user's preferences to obtain the invention as specified in claims 7 and 8.

As per dependent claim **8**, the combination of Rudelic and Thelander teach, wherein the system stores current user preferences and the system state information

comprises whether storage input/output data are associated with current user preferences (Paragraph 45 and Paragraph 48 and Paragraph 53).

Claim **12** is rejected under 35 U.S.C. 103(a) as being obvious over Rudelic in view of Atkinson (U.S. 6,029,249) hereinafter referred to as Atkinson.

Rudelic teach the limitations as noted supra.

Rudelic does not teach counting remaining write cycles.

Atkinson teach, wherein the system state information comprises the number of remaining write cycles (Column 8 lines 48-51).

Rudelic and Atkinson are analogous art because they are from the same field of endeavor, namely computer system power consumption.

At the time of invention it would have been obvious to one of ordinary skill in the art, having both the teachings of Rudelic and Atkinson before him/her, to implement the counter of Atkinson into Rudelic for the benefit of reducing system clock when on supplemental power to increase run time.

The motivation for doing so would have been that, a lower event count causes the frequency switching circuit to switch to a lower frequency to conserve power if the system is not already at this low frequency ... the invention allows the battery powered operating period of a computer system to be greatly extended (Column 3 lines 4-8 of Atkinson).

Therefore it would have been obvious to combine Rudelic with Atkinson for the benefit of increased run time to obtain the invention as specified in claim 12.

Claims **14-15**, **17**, and **20** are rejected under 35 U.S.C. 103(a) as being obvious

over Rudelic in view of Kimura et al (U.S. 6,415,359) hereinafter referred to as Kimura.

As per dependent claim **14**, Rudelic teach a system that stores portions of

operating systems into a hierarchical non-volatile storage device as noted above. In

one embodiment, the portions are selected based on usage and stored into the different

levels of flash memory based on various performance metrics that are gathered and

tracked by the system of Rudelic to improve power consumption (Paragraphs 0046-

0049 of Rudelic).

Rudelic however, does not teach usage of disk based non-volatile storage

devices and as a result is silent on, a mapping schema between cache files in the

second level of storage and disk files in the first level of storage, wherein each cache

file is named with a logical cluster number of its corresponding disk file

Kimura teach usage of disk based non-volatile storage devices and the

transferring of files from the disk device to a cache to improve power consumption

(Abstract of Kimura) and further, a mapping schema between cache files in the second

level of storage and disk files in the first level of storage, wherein each cache file is

named with a logical cluster number of its corresponding disk file (Column 7 lines 31-45

of Kimura).

All of the component parts are known in both Rudelic and Kimura. The only

difference is the combination of the "old elements" into a single device by combining

them for usage in one system.

Thus, it would have been obvious to one of ordinary skill in the art to combine the disk device of Kimura into the system of Rudelic. This would allow the system of Rudelic to enjoy further power consumption benefits by expanding the hierarchy of non-volatile storage devices and giving an additional level of demotion to the system. Thus, objects that are given demotions based on usage from the first flash memory to the second flash memory would be continued to be monitored and further demoted to the third level offered by Kimura and accordingly would allow the system to achieve predictable results of improved power consumption.

As per dependent claim **15**, the combination of Rudelic and Kimura teach,

- o comprising a hard disk drive comprising rotating magnetic media comprising the first level storage and a cache comprising the second level storage and (Column 3 line 55 to Column 4 line 15 of Kimura and the cache as taught by the flash memories of Rudelic in Paragraph 0046).

- o an application-specific integrated circuit for managing the cache according to the energy-conserving criteria (Column 3 lines 41-54 of Kimura).

As per independent claim **17**, the combination of Rudelic and Kimura teach,

- o first level non-volatile storage for storing information; second level non-volatile storage for storing information according to a set of energy-saving criteria; (Paragraph 0046: taught as the first and second flash memories of Rudelic)

- o a battery level detector for determining the level of charge in a battery; (Column 16 lines 55-60 of Kimura).

- o and a controller for storing only strategically selected storage data in the second level of storage when the battery level detector determines that the battery charge is below a pre-determined threshold of charge. (Column 4 lines 16-25 and as taught in the abstract further taught in Column 6 lines 13-30 of Kimura).

As per independent claim **20**, the combination of Rudelic and Kimura teach,

- o first and second levels of non-volatile storage, wherein accessing the first level of storage uses more energy than accessing the second level of storage; (Paragraph 0046: taught as the first and second flash memories of Rudelic)

- o an energy use detector for determining the level of energy being used by the system; and (Column 4 lines 57-67 of Kimura)

- o an arbiter for storing only strategically selected storage data in second level storage when the energy use detector determines that the system is being powered by a battery (Column 4 lines 16-25 and as taught in the abstract further taught in Column 6 lines 13-30 of Kimura).

Response to Arguments

Applicant's arguments, filed 12 July 2007, have been fully considered and are persuasive. However, upon further consideration, a new ground(s) of rejection is made. Accordingly, this action has NOT been made final.

With respect to applicant's argument located within the third paragraph of the third page of the remarks (numbered as page 9) which recites:

> *"As the quoted section reveals, Thelander concerns a power management profile and not a user profile. Thelander does not suggest the second part of claim 7 either. There is no discussion in Thelander of the system state information comprising storage input/output data associated with a current user profile. Therefore, Thelander does not suggest or motivate the modification of Kimura as suggested by the Office Action."*

The Examiner respectfully disagrees and refers Applicants to the new rationale provided in the rejection *supra*

Any argument not specifically addressed is considered moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. U.S. Patent 6,647,499 Morcom teach a system for conserving power.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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BRP/mb

Brian R. Peugh
Primary Examiner